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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/081,197      | 02/22/2002  | Sergio Spreafico     | 0019696-0144        | 4873             |

7590 08/28/2002  
Elizabeth E. Nugent  
Choate, Hall & Stewart  
53 State Street  
Exchange Place  
Boston, MA 02109

EXAMINER

ALCALA, JOSE H

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2827

DATE MAILED: 08/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/081,197

Applicant(s)

SPREAFICO ET AL.

Examiner

Jose H Alcalá

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 16-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 February 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-15, drawn to a superconductor cable, classified in class 174, subclass 125.1.
  - II. Claims 16-29, drawn to a method of making a superconducting cable, classified in class 29, subclass 599.
2. The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case unpatentability of the group I invention would not necessarily imply unpatentability of the group II invention, since the device of the group II invention could be made by process materially different from those of the group I invention. For example, the two superconducting components can be spliced and thermally treated to join one to the other, without soldering. In addition, they can be adhered using a conductive paste or any other conductive adhesive to allow the conduction between both components. Furthermore the components can be two superconducting oxide pieces, each formed by combining the metallic elements of the oxide in substantially the stoichiometric proportions needed to form a precursor, and forming the precursor into a shaped piece. Then the two components are contacted to

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each other, and connected to each other by means for forming a metallurgical bond, and oxidizing the connected shape pieces together.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Elizabeth Nugent on 8/21/02 a provisional election was made with traverse to prosecute the invention of Group 1, claims 1-15. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-29 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Drawings***

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

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Reference numbers 41,42,43 in Figure 4, and 44 in Figures 4-5 are not mentioned in the Specification. Correction is required.

8. Figures are improperly crosshatched. All of the parts shown in the section, and only those parts, must be crosshatched. The crosshatching patterns should be selected from those shown on page 600-81 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP 608.02. For example in Figure 1, reference numbers 14 and 16 need to be shown with the crosshatching pattern of a metal, while Reference number 20 needs to be shown with the crosshatching corresponding to a dielectric material.

### ***Specification***

9. The abstract of the disclosure is objected to because it is more oriented to the method of making the invention, than to the elected invention. Correction is required. See MPEP § 608.01(b).

10. The disclosure is objected to because of the following informalities: It is more oriented to the method of making the invention, than to the elected invention.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

11. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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12. Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding Claim 1, in lines 16-18 the specification is not enabling to how the shape of the first end of at least one of the first and second high temperature superconducting elements is adapted to minimize strain concentration of said wires, which is critical or essential to the practice of the invention.

Regarding Claim 4, the specification is not clear and enabling in having the cable further comprising a second high temperature superconducting wire wrapped helically around the core, where the first and second high temperature superconducting wires have opposite helicity.

Regarding Claim 5, the specification is not clear and enabling to how the shape of the first ends of the first and second high temperature superconducting components are adapted to minimize strain concentrations in first high temperature superconducting wire, which is critical or essential to the practice of the invention.

13. Claims 1-15 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding Claim 1, the specification is not clear in how a first high temperature superconductive wire is wrapped helically around the core member, as claimed in lines 3-4.

### ***Claim Objections***

14. Claim 5 is objected to because of the following informalities: insert --the-- before the phrase "first high temperature superconducting wire", in line 4. Appropriate correction is required.

### ***Double Patenting***

Claims 1-15 may be rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5, 7-8, 10-11, 13-14 of Buzcek U.S. Patent No. 6,159,905. If there is any allowable subject matter further in the prosecution of the case, this will be taken into consideration.

### ***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 1-5, 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaetti et al. (US Patent No. 3,643,001) in view of Kimura et al. (US Patent No. 5,786,304). As best understood by the examiner:

Regarding Claim 1, Schaetti teaches a superconducting cable, comprising: (a) a core member (Reference number 1); and (b) a first high temperature superconducting wire (Reference number 2) wrapped helically around the core member, where the first high temperature superconducting wire comprises (i) a first high temperature superconducting component (Reference number 6) having a first end and a second end; but fails to teach (ii) a layer of a first solder material, a portion of the solder layer attached to at least a portion of the first end of first high temperature superconducting component; and (iii) a second high temperature superconducting component having a first end and a second end, at least a portion of the first end of the second high temperature superconducting component attached to a portion of the solder layer, wherein the portion of the first high temperature superconducting component attached to the solder material and the portion of the second high temperature superconducting component attached to the solder material form an overlap segment. The limitation that the shape of the first end of at least one of the first and second high temperature superconducting components is adapted to minimize strain concentration of said wires, is not being considered, since it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform it does not constitute a limitation in any patentable sense. See *In re Hutchison*, 69 USPQ 138.

Kimura teaches (i) a first high temperature superconducting component (Top reference number 1 in figure 1) having a first end and a second end; (ii) a layer of a first solder material (Reference number 2), a portion of the solder layer attached to at least a



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portion of the first end of first high temperature superconducting component; and (iii) a second high temperature superconducting component (Bottom reference number 1 in figure 1) having a first end and a second end, at least a portion of the first end of the second high temperature superconducting component attached to a portion of the solder layer, wherein the portion of the first high temperature superconducting component attached to the solder material and the portion of the second high temperature superconducting component attached to the solder material form an overlap segment (See section where one is attached to the other in figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schaetti and Kimura, in order to have a two high temperature superconducting components joined by a solder material forming an overlap segment, thus eliminating the formation of an undesired grain boundary in the junction between the two superconducting components.

Regarding Claim 2, Schaetti teaches at least one protective layer (column 2, lines 30-31 of Schaetti) connected to the first ends of the first and second high temperature superconducting components. It would have been obvious to one of ordinary skill in the art at the time the invention was made, to have the protective layer connected to the first ends of the first and second high temperature superconducting components, in order to protect and cover the junction area in order to stabilize the connection.

Regarding Claim 3, Kimura teaches that the overlap segment has a critical current of more than 50% of the lesser of critical currents of the first and second high

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temperature superconducting components (See column 1, lines 41-43 and column 8, lines 44 and 45), where critical current is determined using a  $1 \mu\text{V}/\text{cm}$  criterion. Kimura fails to explicitly teach that a section of the first superconducting wire has a length at least 100 times the length of the overlap segment and that the overlap segment has a critical current at least 80% of the lesser of critical currents of the first and second high temperature superconducting components. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the critical current at least 80% of the lesser of critical currents of the first and second high temperature superconducting components, since it is desired to approximate the critical current of the overlapping section to the critical current of the superconducting components. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make a section of the first superconducting wire having a length at least 100 times the length of the overlap segment, since it is desired to eliminate the effects of having a section with less critical current than the rest of the superconducting elements. In addition, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See *In re Aller*, 105 USPQ 233.

Regarding Claim 4, Schaetti teaches a second high temperature superconducting wire wrapped helically around the core (Another one of the wires Reference number 2), but fails to teach that the first and second high temperature superconducting wires have opposite helicity. In addition Schaetti teaches that nonsuperconductive wires (Reference number 4) have opposite helicity (column 2, lines

38-41)to the superconducting wires. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the first and second high temperature superconducting wires have opposite helicity, in order to increase the electrical field in the cable.

Regarding Claim 5, Schaetti teaches that the first high temperature superconducting wire is wrapped around the core with a constant pitch (See Figure). The limitation that the shape of the first ends of the first and second high temperature superconducting components are adapted to minimize strain concentrations in first high temperature superconducting wire, is not being considered, since it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform it does not constitute a limitation in any patentable sense. See *In re Hutchison*, 69 USPQ 138.

Regarding Claim s 12-15, Kimura teaches that the overlap segment has a critical current of more than 50% of the lesser of critical currents of the first and second high temperature superconducting components (See column column 1, lines 41-43 and column 8, lines 44 and 45), where critical current is determined using a 1  $\mu\text{V}/\text{cm}$  criterion. Kimura fails to explicitly teach that the overlap segment has a critical current at least 85%, 90%, 95%, or 99% of the lesser of critical currents of the first and second high temperature superconducting components. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the critical current at least 85%, 90%, 95%, or 99% of the lesser of critical currents of the first and second

high temperature superconducting components, since it is desired to approximate the critical current of the overlapping section to the critical current of the superconducting components. In addition, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. See *In re Aller*, 105 USPQ 233.

17. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaetti et al. (US Patent No. 3,643,001) in view of Kimura et al. (US Patent No. 5,786,304) and further in view of Fujikami et al. (US Patent No. 5,358,929). As best understood by the examiner:

Regarding claims 6 and 7, Schaetti as modified by Kimura teaches all the elements of the invention as stated supra for claim 1, but fails to explicitly teach that the first ends of the first and second high temperature superconducting components are substantially triangular. Fujikami teaches the first ends of the first and second high temperature superconducting components are substantially triangular (See figure 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the first ends of the first and second high temperature superconducting components to be substantially triangular, in order to suppress reduction of critical current in the overlapping section.

Regarding claims 8 and 9, Schaetti as modified by Kimura teaches all the elements of the invention as stated supra for claim 1, but fails to explicitly teach that the first ends of the first and second high temperature superconducting components are substantially diagonal. Fujikami teaches the first ends of the first and second high

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temperature superconducting components are substantially diagonal (See figure 17B). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the first ends of the first and second high temperature superconducting components to be substantially diagonal, in order to suppress reduction of critical current in the overlapping section.

Regarding claims 10 and 11, Schaetti as modified by Kimura teaches all the elements of the invention as stated supra for claim 1, but fails to explicitly teach that the first ends of the first and second high temperature superconducting components are substantially inverted triangular. Fujikami teaches the first ends of the first and second high temperature superconducting components are substantially inverted triangular (See figure 22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the first ends of the first and second high temperature superconducting components to be substantially inverted triangular, in order to suppress reduction of critical current in the overlapping section.

### ***Conclusion***

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references show some of the elements disclosed in the instant claimed invention: Englehardt et al. (US Patent No. 6,262,375), Aupoix et al. (US Patent No. 3,730,966), Aupoix et al. (US Patent No. 3,600,498), Bogner et al. (US Patent No. 3,749,811), Womack, Jr. et al. (US Patent No. 4,845,308), Iwata et al. (US Patent No. 4,039,740), Lashkaris (US Patent No. 5,047,741), Preisler et al. (US Patent


No. 5,244,876), Benz et al. (US Patent No. 5,134,040), Dorri et al. (US Patent No. 5,253,413, Joshi et al. (US Patent No. 5,116,810), Joshi et al. (US Patent No. 5,321,003), Sato et al. (US Patent No. 5,051,397) and Salama et al. (US Patent No. 3,600,498).

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose H Alcala whose telephone number is (703) 305-9844. The examiner can normally be reached on Monday to Friday.

20. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JHA  
August 26, 2002



KAMAND CUNEO  
PRIMARY EXAMINER